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ORIGINAL ARTICLE

A new species of the genus *Macrobiotus* (Tardigrada: Macrobiotidae) from Southeastern China

Pin Zhang[1], Xi-Zhai Sun[1, 2 *]

[1]*College of Life Sciences, Shaanxi Normal University, Xi'an 710062, China*
[2]*Department of Life Sciences, Heze University, Heze 274015, China*
[*]*Corresponding author, E-mail:sxzhzu@126.com.*

Abstract A new species *Macrobiotus wuyishanensis* **sp. nov.** (Tardigrada: Macrobiotidae) is described from Mt. Wuyi, Southeastern China. It is most similar to *Macrobiotus spectabilis* Thulin, 1928, but differs by lacking fine punctuation on the distal half of the projections on the egg, a ring of polygons that circle the base of each projection, and punctation between the projections on the egg shell. It is also similar to *M. grandis* Richters, 1911, but differs by smaller body size, lacking polygons and punctations between the projections on egg shell.

Key words Tardigrada, *Macrobiotus*, new species, China.

Tardigrades, which are commonly called "water bears", are a kind of hydrophilous micrometazoans and are considered as an independent phylum—Tardigrada (Ramazzotti & Maucci, 1983). In total, 161 tardigrade species have been described or reported from China (Gao *et al.*, 2012). Among them, 21 species of the genus *Macrobiotus* have been reported from China (Li *et al.*, 2007; Yin *et al.*, 2011). In 2011, the authors collected some mosses from the Zhaixia Valley, Mt. Wuyi, Fujian, China (26°54′N, 117°05′E; elev. 357 m). A new species of genus *Macrobiotus* (Tardigrada: Eutardigrada: Macrobiotidae) was found in these moss samples, namely *Macrobiotus wuyishanensis* **sp. nov.**

1 Materials and methods

Tardigrades were extracted from moss samples using a glass pipette and were mounted in Hoyer's medium. Structures, including body, buccal apparatus, claws, etc., were measured under microscope only if they were in proper orientations. Body length was measured from the front-end to the terminal end of the body. Buccal tube length and level of the stylet support insertion point were measured according to the method of Pilato (1981). The buccal tube width was measured on the location that stylet support inserts. The *pt* index is the percent ratio of the length of a given structure (e.g. pharyngeal bulb and claws) to the length of the buccal tube measured from the mediodorsal transverse ridge of the buccal armature to the base of the pharyngeal apophyses (Pilato 1981). Observation and measurements were made using phase contrast microscope (Nikon 80i, Nikon Corporations) and an eyepiece micrometer. Photomicrographs were made using microscope associated with a digital camera (Nikon DS-Fi1).

2 Taxonomy

Class Eutardigrada Richters, 1926
Order Parachela Schuster, Nelson, Grigarick, & Christenberry, 1980
Family Macrobiotidae Thulin, 1928
Genus *Macrobiotus* Schultze, 1834

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***Macrobiotus wuyishanensis* sp. nov.** (Figs 1–6, Table 1)

Material examined. Holotype, slide no. wy1981, Zhaixia Valley, Mt. Wuyi, Fujian. Four paratypes, slide no. wy1976–wy1979 and one egg (Fig. 7). All specimens are deposited at the College of Life Sciences, Shaanxi Normal University.

Description. Colorless. Eyespots present (Fig. 2). Cuticle smooth without pores, dots or any other sculptures. Buccopharyngeal apparatus of *Macrobiotus*-type (Figs 1–2).

Mouth terminal with 10 peribuccal lamellae. Oral cavity armature well developed and composed of a band of teeth in shape of a row of small ridges parallel to the main axis of the buccal tube and 3 ventral transverse ridges (Fig. 2). Buccal tube with the ventral lamina and one bend in anterior part of tube (Fig. 2). Pharyngeal bulb spherical with apophyses, two macroplacoids and a microplacoid. Pharyngeal apophyses obvious upset triangle-shaped. First macroplacoid rod-shaped with a medial projection that points inward becomes narrower in anterior part, much longer than the second macroplacoid, the second macroplacoid rod-shaped, slightly curved, a slight constriction at the proximal end (Fig. 2). Microplacoid medium, thin and placed close to the second macroplacoid (Fig. 2, Table 1).

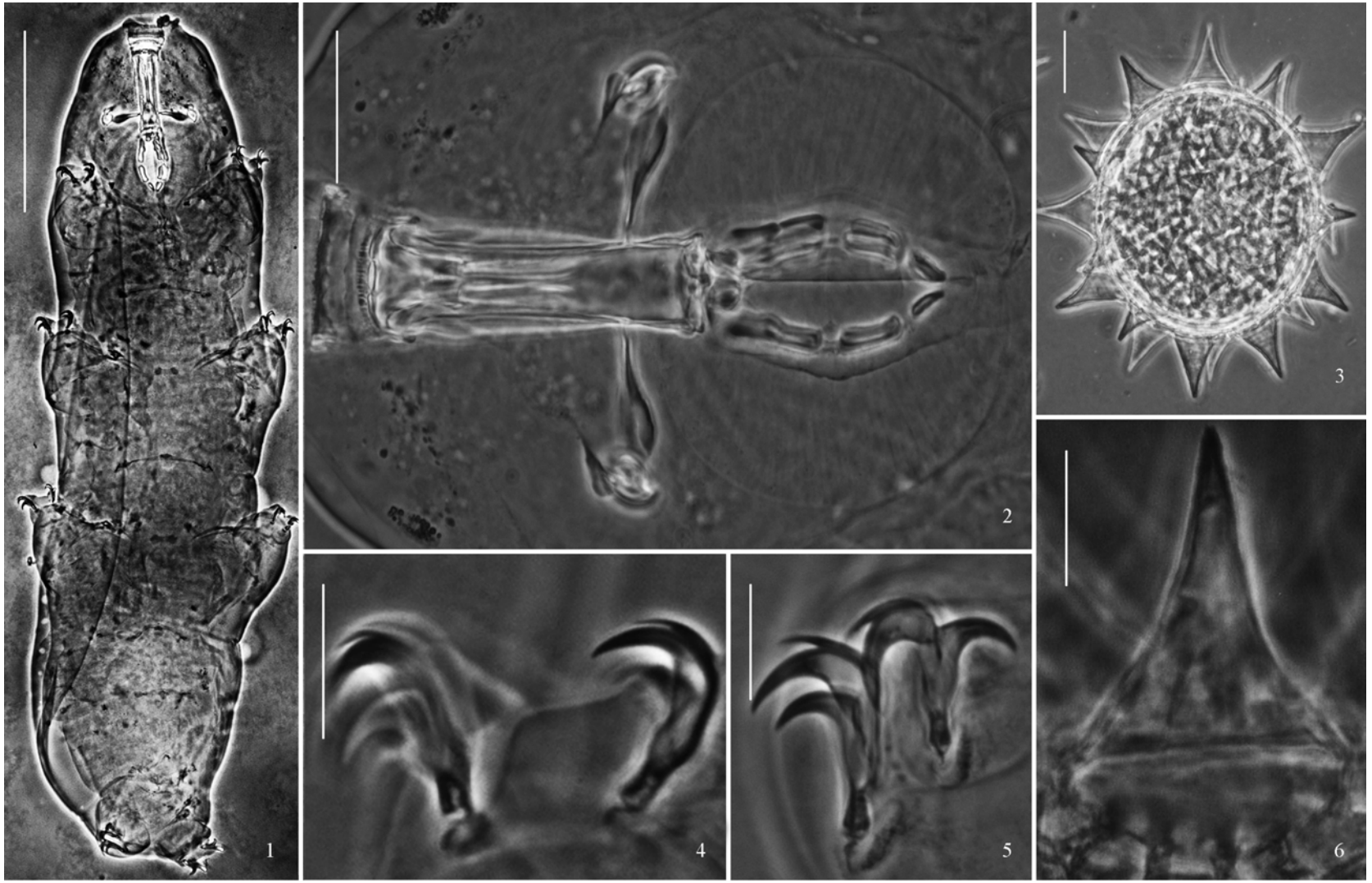
Claws of *hufelandi*-type. Claws with an evident thin stalk (Figs 3, 4), external claws larger than internal claws; the primary branch longer than the secondary branch; primary branches in all claws on all legs with strong accessory points. Lunules smooth on all legs (Figs 3–4, Table 1).

Egg laid free, spherical, without areolation. Diameter with projections 168.3 μm, diameter without processes 96.3 μm, projection length 35.0 μm, projection width at base 20.5 μm. Projections (13 on circumference of egg) cone-shaped, surface of the projection smooth without any sculpture, shell surface between the conical projections smooth (Figs 5–6).

Table 1. Dimensions (in μm) of *Macrobiotus wuyishanensis* sp. nov.

Character*	Holotype		Paratype 1		Paratype 2		Paratype 3		Paratype 4	
	wy1981	*pt*	wy1977	*pt*	wy1976	*p*t	wy1979	*p*t	wy1978	*pt*
Body length	694.5	1024	469.2	875.4	675.3	983	740.6	1091	730.1	1026
Body width	177.1	262	162.4	303	201	292.6	248.5	366	239.4	344.2
Buccal tube length	67.6	100	53.6	100	68.7	100	67.9	100	72.2	94
Buccal tube width	13.1	19.4	8.7	16.2	12.6	18.3	14.6	21.5	14.3	20.2
stylet support	52.7	78	43.7	81.5	54.8	79.8	54.1	79.7	55.3	74.9
1st macroplacoid	20.3	30	13.9	25.9	21.4	31.1	19.6	28.9	19.7	27.1
2nd macroplacoid	12.2	18	9.1	17.0	13.5	19.7	12.7	18.7	14.1	17.6
microplacoid	6.8	10.1	6.2	11.6	8	11.6	9.5	14.0	5.8	13.2
Measuring length of Placoid row	34.1	50.4	24.8	46.3	38.8	56.5	37.7	55.5	38.6	52.2
pharyngeal bulb length	75.7	112	60.8	113.4	82.1	119.5	84.4	124.3	83.5	116.9
pharyngeal bulb width	78.4	116	58.6	109.3	81.3	118.3	72.2	106.3	78.8	100
P.b. of external claw on 1st p.o.l	18.3	27.1	12.7	23.7	17	24.7	17.7	26.1	18.4	24.5
S.b. of external claw on 1st p.o.l	13.6	20.1	8.6	16.0	13.1	19.1	12.7	18.7	14.2	17.6
P.b. of internal claw on 1st p.o.l	15.8	23.4	11.9	22.2	16.1	23.4	14.6	21.5	17.8	20.2
S.b. of internal claw on 1st p.o.l	9.1	13.5	8.2	15.3	11.7	17.0	11.1	16.3	13.8	15.4
P.b. of external claw on 2nd p.o.l	18.1	26.8	14	26.1	16	23.3	18.1	26.7	18.3	25.1
S.b. of external claw on 2nd p.o.l	13.7	20.3	9.9	18.5	12.9	18.8	12.9	19.0	15.3	17.9
P.b. of internal claw on 2nd p.o.l	15.5	22.9	12.8	23.9	15.7	22.9	16.9	24.9	16.3	23.4
S.b. of internal claw on 2nd p.o.l	13.4	19.8	9.7	18.1	12.8	18.6	12.9	19.0	13.7	17.9
P.b. of external claw on 3rd p.o.l	18.2	26.9	14	26.1	17.8	25.9	19.7	29.0	18.7	27.3
S.b. of external claw on 3rd p.o.l	13.4	19.8	9.8	18.3	13.4	19.5	15.1	22.2	15.5	20.9
P.b. of internal claw on 3rd p.o.l	15.2	22.5	13.2	24.6	16	23.3	18.5	27.2	18.5	25.6
S.b. of internal claw on 3rd p.o.l	12.5	18.5	9.5	17.7	12.4	18.0	13.4	19.7	14.2	18.6
P.b. of external claw on 4th p.o.l	21.6	32.0	15.7	29.3	20.5	29.8	20.8	30.6	19.9	28.8
S.b. of external claw on 4th p.o.l	15.1	22.3	11.6	21.6	13.4	19.5	16.9	24.9	16.2	23.4
P.b. of internal claw on 4th p.o.l	16.1	23.8	13.1	24.4	18	26.2	18.9	27.8	19.5	26.2
S.b. of internal claw on 4th p.o.l	13.3	19.7	9.6	17.9	13.5	19.7	14.1	20.8	14.2	19.5

*P.b., primary branch; p.o.l, pair of legs; S.b., secondary branch.



Figs 1–6. *Macrobiotus wuyishanensis* **sp. nov**. (holotype, slide number: wy1981). 1. Habitus. 2. Buccal apparatus. 3. Claws on the first pair of legs. 4. Claws on the hind legs. 5. Egg. 6. Picture focused at the project. Scale bars: 1 = 150 μm; 2, 5 = 30 μm; 3–4, 6 = 10 μm.

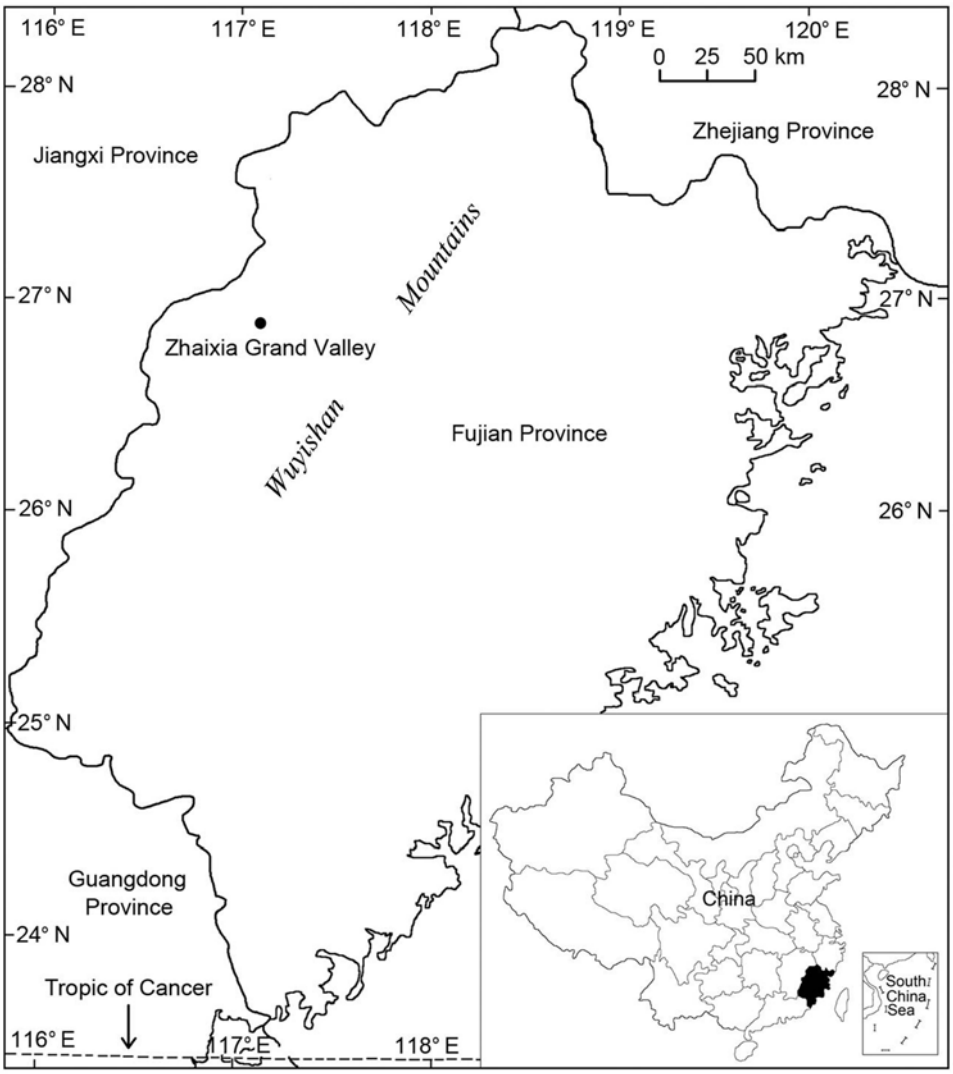


Fig. 7. Locality of *Macrobiotus wuyishanensis* **sp.nov.**

Etymology. The specific name of the new species refers to its type locality.

Remarks. Measurements of all found specimens are provided in Table 1. The species is closely allied to *M. spectabilis* Thulin, 1928 (Thulinm, 1928) and *M. grandis* Richters, 1911 (Ramazzotti & Maucci, 1983). Because the eggs are the important characters of species level taxonomy of the genus *Macrobiotus*, the characters of eggs are compared. The new species differs from *M. spectabilis* by the lacking of the fine punctuation on the distal half of the projections on the egg, the ring of polygons that circle the base of each projection, and punctation between the projections on the egg shell.It is also different by different number of projections on the shell (13 on circumference of egg of *M. wuyishanensis* **sp. nov.**, while 11 or 12, on circumference of egg of *M. spectabilis*). This new species differs from *M. grandis* by smaller body size, lacking polygons and punctations between the projections. It has 13 projections on circumference of egg instead of 10 projections in *M. grandis*.

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Correction

Du F-Y, Lin Z-J, Xu Z-Z, Huang J-Q and Guo D-H. 2013. *Three new species of Hydroidomedusae (Cnidaria) from the Meiji Reef and Daya Bay, South Chian Sea*. *Acta Zootaxonomica Sinica*, 38(4): 749–755.

Because of authors' neglect, the authorships of the two new species, *Hydrocoryne condensa* and *Euphysora meijiensis* were wrongly exchanged. They should be corrected as *Hydrocoryne condensa* Xu, Huang & Guo, 2013 and *Euphysora meijiensis* Xu, Huang & Du, 2013.